

# STM32Cube function pack for IoT node with NFC, BLE connectivity and time-of-flight sensors

Application	FP-SNS-FLIGHT1
Middleware	BLE, NDEF, Meta Data Manager
Hardware Abstraction	STM32Cube Hardware Abstraction Layer (HAL)
Hardware	STM32 Nucleo expansion boards X-NUCLEO-IDB05A2 (Connect) X-NUCLEO-NFC04A1 (Connect) X-NUCLEO-53L1A2 (Sense) STM32 Nucleo development board



## Features

- Complete firmware to develop an IoT node with NFC, BLE connectivity and Time-of-Flight sensors
- Compatible with [STBLESensor](#) application for Android/iOS to perform distance data reading and firmware update (FOTA)
- Multi-target ranging sensor application based on the [VL53L1](#) Time-of-Flight (ToF) sensor
- Sample implementation available for [X-NUCLEO-NFC04A1](#) (optional), [X-NUCLEO-53L1A2](#) and [X-NUCLEO-IDB05A2](#) connected to a [NUCLEO-F401RE](#) or [NUCLEO-L476RG](#)
- Easy portability across different MCU families, thanks to [STM32Cube](#)
- Free, user-friendly license terms

## Description

The [FP-SNS-FLIGHT1](#) is an [STM32Cube](#) function pack which lets your IoT node connect to a smartphone via BLE and uses a suitable Android™ or iOS™ application like the [STBLESensor](#) app to view real-time object distance data read by the Time-of-Flight sensor.

The package also enables advanced functions, such as presence detection inside a fixed range distance.

If the [X-NUCLEO-NFC04A1](#) expansion board is present, it uses the NDEF standard for simple and secure Bluetooth pairing, storing the necessary information on the NFC tag, thus simplifying the device configuration.

This package, together with the suggested combination of the STM32 and ST devices, can be used to develop wearable applications or smart thing applications in general.

The software runs on the STM32 microcontroller and includes all the necessary drivers to recognize the devices on the [STM32 Nucleo](#) development board.

Product summary	
STM32Cube function pack for IoT node with NFC, BLE connectivity and time-of-flight sensors	<a href="#">FP-SNS-FLIGHT1</a>
Ranging sensor expansion board based on VL53L1	<a href="#">X-NUCLEO-53L1A2</a>
Dynamic NFC/RFID tag IC expansion board	<a href="#">X-NUCLEO-NFC04A1</a>
Bluetooth low energy expansion board based on the BlueNRG-M0 module	<a href="#">X-NUCLEO-IDB05A2</a>
Applications	Bluetooth Low Energy

## 1 Detailed description

### 1.1 What can you do with STM32Cube function packs?

STM32Cube function packs leverage the modularity and interoperability of STM32 Nucleo and X-NUCLEO boards together with STM32Cube and X-CUBE software to create function examples for some of the most common use cases of different application technologies.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible to best satisfy the requirements of final user applications.

Moreover, function packs may include additional libraries and frameworks that are not present in the original X-CUBE packages, thus enabling new functionalities allowing real and usable system for developers.

### 1.2 What is STM32Cube?

STM32Cube is a combination of a full set of PC software tools and embedded software blocks running on STM32 microcontrollers and microprocessors:

- [STM32CubeMX](#) configuration tool for any STM32 device; it generates initialization C code for Cortex-M cores and the Linux device tree source for Cortex-A cores
- [STM32CubeIDE](#) integrated development environment based on open-source solutions like Eclipse or the GNU C/C++ toolchain, including compilation reporting features and advanced debug features
- [STM32CubeProgrammer](#) programming tool that provides an easy-to-use and efficient environment for reading, writing and verifying devices and external memories via a wide variety of available communication media (JTAG, SWD, UART, USB DFU, I2C, SPI, CAN, etc.)
- STM32CubeMonitor family of tools ([STM32CubeMonRF](#), [STM32CubeMonUCPD](#), [STM32CubeMonPwr](#)) to help developers customize their applications in real-time
- [STM32Cube MCU and MPU packages](#) specific to each STM32 series with drivers (HAL, low-layer, etc.), middleware, and lots of example code used in a wide variety of real-world use cases
- [STM32Cube expansion packages](#) for application-oriented solutions

### 1.3 How does STM32 ODE function pack complement STM32Cube?

This software is based on the STM32CubeHAL. It extends STM32Cube by providing a board support package (BSP) for the [BlueNRG-M0](#) module, dynamic NFC tag expansion boards, Time-of-Flight ranging expansion board and middleware components for communication with other Bluetooth devices and management of NDEF message format.

## Revision history

**Table 1. Document revision history**

Date	Version	Changes
01-Mar-2016	1	Initial release.
05-Dec-2016	2	Updated title, cover image, Features, Description Added STM32 ODE compatibility.
20-Feb-2017	3	Updated cover page image and Features and Description sections. Updated section How does STM32 ODE Function Pack complement STM32Cube? Added X-NUCLEO-IKS01A2 expansion board compatibility information.
29-Mar-2017	4	Updated cover page image, features and description. Updated <i>How does STM32 ODE function pack complement STM32Cube?</i>
19-Jul-2017	5	Updated cover image, features and description.
05-Sep-2018	6	Updated cover image, features and description.
25-Sep-2020	7	Updated cover page image, features and description. Updated Section 1.3 How does STM32 ODE function pack complement STM32Cube?.
02-Nov-2020	8	Updated title.

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